

<p align="center">NOTICE OF REVISION (NOR)</p> <p>This revision described below has been authorized for the document listed.</p>		<p>1. DATE (YYMMDD) 94-11-09</p>	<p>Form Approved OMB No. 0704-0188</p>
<p>Public reporting burden for this collection is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503. PLEASE DO NOT RETURN YOUR COMPLETED FORM TO EITHER OF THESE ADDRESSED. RETURN COMPLETED FORM TO THE GOVERNMENT ISSUING CONTRACTING OFFICER FOR THE CONTRACT/ PROCURING ACTIVITY NUMBER LISTED IN ITEM 2 OF THIS FORM.</p>		<p>2. PROCURING ACTIVITY NO.</p>	
<p>3. DODAAC</p>			
<p>4. ORIGINATOR</p>	<p>b. ADDRESS (Street, City, State, Zip Code) Defense Electronics Supply Center 1507 Wilmington Pike Dayton, OH 45444-5270</p>	<p>5. CAGE CODE 67268</p>	<p>6. NOR NO. 5962-R030-95</p>
<p>a. TYPED NAME (First, Middle Initial, Last)</p>		<p>7. CAGE CODE 67268</p>	<p>8. DOCUMENT NO. 5962-91694</p>
<p>9. TITLE OF DOCUMENT MICROCIRCUIT, LINEAR, VOLTAGE CONTROLLED GAIN AMPLIFIER, MONOLITHIC SILICON</p>		<p>10. REVISION LETTER</p>	
		<p>a. CURRENT B</p>	<p>b. NEW C</p>
		<p>11. ECP NO. 5962-91694ECP-1</p>	
<p>12. CONFIGURATION ITEM (OR SYSTEM) TO WHICH ECP APPLIES ALL</p>			
<p>13. DESCRIPTION OF REVISION</p> <p>Sheet 1: Revisions ltr column; add "C". Revisions description column; add "Changes in accordance with NOR 5962-R030-95". Revisions date column; add "94-11-09". Revision level block; delete "B" and substitute "C". Rev status of sheets; For sheets 1, 5, delete "B" and substitute "C".</p> <p>Sheet 5: TABLE I. Common mode rejection ratio test. Under the conditions column, delete footnote "4/" and substitute footnote "3/". Footnote "3/" states; "If not tested, shall be guaranteed to the limits specified in table I herein." Revision level block; delete "B" and substitute "C".</p>			
<p>14. THIS SECTION FOR GOVERNMENT USE ONLY</p>			
<p>a. (X one)</p>	<p>X</p>	<p>(1) Existing document supplemented by the NOR may be used in manufacture.</p>	
		<p>(2) Revised document must be received before manufacturer may incorporate this change.</p>	
		<p>(3) Custodian of master document shall make above revision and furnish revised document.</p>	
<p>b. ACTIVITY AUTHORIZED TO APPROVE CHANGE FOR GOVERNMENT DESC-ELDS</p>		<p>c. TYPED NAME (First, Middle Initial, Last) MICHAEL A. FRYE</p>	
<p>d. TITLE CHIEF, MICROELECTRONICS BRANCH</p>	<p>e. SIGNATURE MICHAEL A. FRYE</p>		<p>f. DATE SIGNED (YYMMDD) 94-11-09</p>
<p>15a. ACTIVITY ACCOMPLISHING REVISION DESC-ELDS</p>	<p>b. REVISION COMPLETED (Signature) RICK C. OFFICER</p>		<p>c. DATE SIGNED (YYMMDD) 94-11-09</p>

<p align="center">NOTICE OF REVISION (NOR)</p> <p>This revision described below has been authorized for the document listed.</p>		<p>1. DATE (YYMMDD) 93-10-15</p>	<p>Form Approved OMB No. 0704-0188</p>
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<p>a. TYPED NAME (First, Middle Initial, Last)</p>		<p>7. CAGE CODE 67268</p>	<p>8. DOCUMENT NO. 5962-91694</p>
<p>9. TITLE OF DOCUMENT MICROCIRCUIT, LINEAR, VOLTAGE CONTROLLED GAIN AMPLIFIER, MONOLITHIC SILICON</p>		<p>10. REVISION LETTER</p>	
		<p>a. CURRENT A</p>	<p>b. NEW B</p>
		<p>11. ECP NO. 5962-91694ECP-1</p>	
<p>12. CONFIGURATION ITEM (OR SYSTEM) TO WHICH ECP APPLIES ALL</p>			
<p>13. DESCRIPTION OF REVISION</p> <p>Sheet 1: Revisions ltr column; add "B". Revisions description column; add "Changes in accordance with NOR 5962-Rxxx-93". Revisions date column; add "93-10-15". Revision level block; add "B". Rev status of sheets; For sheets 1, 3, 5, 6, 7, and 8, add "B".</p> <p>Sheet 3: 1.3. Absolute maximum ratings. Power dissipation, delete "409 mW" and substitute "1.2 W". Thermal resistance, junction-to-ambient, delete "+75° C/W" and substitute the following; Case C (side braze). 70° C/W Case C (cerdip) 90° C/W Case 2 55° C/W Revision level block; add "B".</p> <p>Sheet 5: TABLE I. Output voltage swing test. Add footnote 3/ to conditions column. For +V_O, group A subroup 5, delete "+3.2 V" minimum and substitute "+3.0 V" minimum. For -V_O, group A subroup 5, delete "-3.2 V" minimum and substitute "-3.0 V" minimum. Revision level block; delete "B" and substitute "C".</p> <p align="center">CONTINUED ON NEXT SHEET.</p>			
<p>14. THIS SECTION FOR GOVERNMENT USE ONLY</p>			
<p>a. (X one)</p>	<p>X</p>	<p>(1) Existing document supplemented by the NOR may be used in manufacture.</p>	
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<p>15a. ACTIVITY ACCOMPLISHING REVISION DESC</p>	<p>b. REVISION COMPLETED (Signature) RICK C. OFFICER</p>		<p>c. DATE SIGNED (YYMMDD) 93-10-15</p>

10. DESCRIPTION OF REVISION - CONTINUED

Document No.: 5962-91694
Revision: BA
NOR No.: 5962-R237-93
Sheet: 2 of 2

Sheet 5: Table I.
Power supply rejection ratio test. Delete and substitute the following:

Power supply sensitivity	PS S	V+ = +4.5 V to +5.0 V V- = -4.5 V to -5.0 V Output referred dc	1,2,3	01		28	mV/ V
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Revision level block; add "B".

Sheet 6: TABLE I. Output current test. Delete footnote 4/ and substitute 3/.
Revision level block; add "B".

Sheet 7: TABLE I.
Gain flatness peaking low test. Under conditions column, delete the word "At". For group A subgroups 5 and 6, delete footnote 3/.
Gain flatness peaking high test. Under conditions column, delete the word "At"/ For group A subgroups 5 and 6, delete footnote 3/.
Gain flatness rolloff test. Under conditions column, delete the word "At". For group A subgroups 5 and 6, delete footnote 3/.
Small signal bandwidth test. For group A subgroups 5 and 6, delete footnote 3/.
Gain control channel small signal bandwidth test. Under conditions column, delete " $V_G = +1$ V" and substitute " $V_G = +1$ V dc".
Revision level block; add "B".

Sheet 8: TABLE I.
Linear phase deviation test. Under conditions column, delete the word "At".
2nd harmonic distortion test. Under conditions column, delete " $2V_{pp}$ at 20 Mhz" and substitute " $2 V_{pp}$, 20 Mhz". For group A subgroups 5 and 6, delete footnote 3/.
3rd harmonic distortion test. Under conditions column, delete " $2V_{pp}$ at 20 Mhz" and substitute " $2 V_{pp}$, 20 Mhz". For group A subgroups 5 and 6, delete footnote 3/.
Equivalent output noise floor test. Under conditions column, delete the word "At".
Equivalent output integrated noise test. Under conditions column, delete the word "At".
Revision level block; add "B".

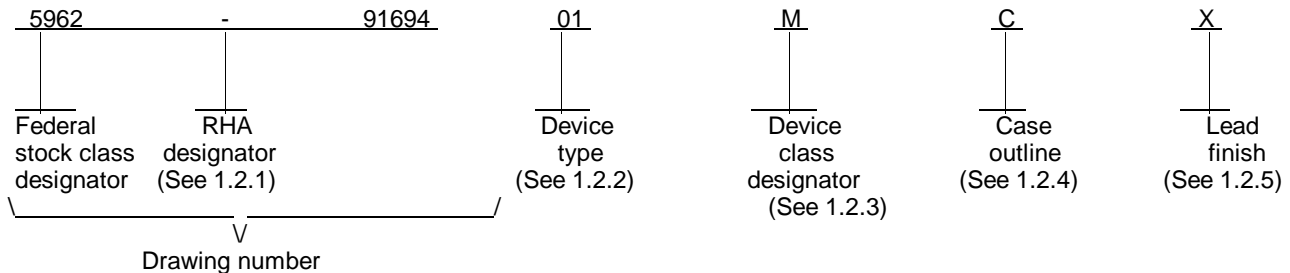
NOTICE OF REVISION (NOR) (See MIL-STD-480 for instructions) This revision described below has been authorized for the document listed.		DATE (YYMMDD) 93-05-06	Form Approved OMB No. 0704-0188								
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1. ORIGINATOR NAME AND ADDRESS Defense Electronics Supply Center Dayton, Ohio 45444-5277		2. CAGE CODE 67268	3. NOR NO. 5962-R147-93								
		4. CAGE CODE 67268	5. DOCUMENT NO. 5962-91694								
6. TITLE OF DOCUMENT MICROCIRCUIT, LINEAR, VOLTAGE CONTROLLED GAIN AMPLIFIER, MONOLITHIC SILICON		7. REVISION LETTER	(New) A								
		8. ECP NO.									
9. CONFIGURATION ITEM (OR SYSTEM) TO WHICH ECP APPLIES											
10. DESCRIPTION OF REVISION Sheet 1: Revisions ltr column; add "A" Revisions description column; add "Changes in accordance with NOR 5962-R147-93". Revisions date column; add "93-05-06". Revision level block; add "A". Rev status of sheets; For sheets 1, 2, and 10; add "A". Sheet 2: 1.2.4 <u>Case outline(s)</u> . Add the following data; <table border="0" style="width: 100%;"> <tr> <td style="text-align: center;"><u>Outline letter</u></td> <td style="text-align: center;"><u>Descriptive designator</u></td> <td style="text-align: center;"><u>Terminals</u></td> <td style="text-align: center;"><u>Package style</u></td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">CQCC1-N20</td> <td style="text-align: center;">20</td> <td style="text-align: center;">Square leadless chip carrier</td> </tr> </table> Revision level block; add "A". Sheet 10: FIGURE 1. <u>Terminal connections</u> . Add case outline "2" for device type 01. Pin 1 is NC, pin 2 is V+, pin 3 is V _G , pin 4 is INPUT+, pin 5 is NC, pin 6 is R _{G+} , pin 7 is NC, pin 8 is R _{G-} , pin 9 is -INPUT, pin 10 is V-, pin 11 is NC, pin 12 is V-, pin 13 is V _{REF} , pin 14 is OUTPUT, pin 15 is NC, pin 16 is GND, pin 17 is NC, pin 18 is I-, pin 19 is NC, and pin 20 is V+. Revision level block; add "A".				<u>Outline letter</u>	<u>Descriptive designator</u>	<u>Terminals</u>	<u>Package style</u>	2	CQCC1-N20	20	Square leadless chip carrier
<u>Outline letter</u>	<u>Descriptive designator</u>	<u>Terminals</u>	<u>Package style</u>								
2	CQCC1-N20	20	Square leadless chip carrier								
11. THIS SECTION FOR GOVERNMENT USE ONLY											
a. CHECK ONE <input checked="" type="checkbox"/> EXISTING DOCUMENT SUPPLEMENTED <input type="checkbox"/> REVISED DOCUMENT MUST BE <input type="checkbox"/> CUSTODIAN OF MASTER DOCUMENT BY THIS NOR MAY BE USED IN RECEIVED BEFORE MANUFACTURER SHALL MAKE ABOVE REVISION AND MANUFACTURE. MAY INCORPORATE THIS CHANGE. FURNISH REVISED DOCUMENT TO:											
b. ACTIVITY AUTHORIZED TO APPROVE CHANGE FOR GOVERNMENT	SIGNATURE AND TITLE MICHAEL A. FRYE	DATE (YYMMDD) 93-05-06									
12. ACTIVITY ACCOMPLISHING REVISION DESC-ECS	REVISION COMPLETED (Signature) RICK C. OFFICER	DATE (YYMMDD) 93-05-06									

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1. SCOPE

1.1 Scope. This drawing forms a part of a one part - one part number documentation system (see 6.6 herein). Two product assurance classes consisting of military high reliability (device classes B, Q, and M) and space application (device classes S and V), and a choice of case outlines and lead finishes are available and are reflected in the Part or Identifying Number (PIN). Device class M microcircuits represent non-JAN class B microcircuits in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices". When available, a choice of radiation hardness assurance (RHA) levels are reflected in the PIN.

1.2 PIN. The PIN shall be as shown in the following example:



1.2.1 Radiation hardness assurance (RHA) designator. Device classes M, B, and S RHA marked devices shall meet the MIL-M-38510 specified RHA levels and shall be marked with the appropriate RHA designator. Device classes Q and V RHA marked devices shall meet the MIL-I-38535 specified RHA levels and shall be marked with the appropriate RHA designator. A dash (-) indicates a non-RHA device.

1.2.2 Device type(s). The device type(s) shall identify the circuit function as follows:

<u>Device type</u>	<u>Generic number</u>	<u>Circuit function</u>
01	CLC520	Voltage controlled gain amplifier

1.2.3 Device class designator. The device class designator shall be a single letter identifying the product assurance level as follows:

<u>Device class</u>	<u>Device requirements documentation</u>
M	Vendor self certification to the requirements for non-JAN class B microcircuits in accordance with 1.2.1 of MIL-STD-883
B or S	Certification and qualification to MIL-M-38510
Q or V	Certification and qualification to MIL-I-38535

1.2.4 Case outline(s). The case outline(s) shall be as designated in MIL-STD-1835 and as follows:

<u>Outline letter</u>	<u>Descriptive designator</u>	<u>Terminals</u>	<u>Package style</u>
C	CDIP1-T14 or GDIP2-T14	14	Dual-in-line

1.2.5 Lead finish. The lead finish shall be as specified in MIL-M-38510 for classes M, B, and S or MIL-I-38535 for classes Q and V. Finish letter "X" shall not be marked on the microcircuit or its packaging. The "X" designation is for use in specifications when lead finishes A, B, and C are considered acceptable and interchangeable without preference.

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1.3 Absolute maximum ratings. ^{1/}

Supply voltage (V_{\pm})	-----	± 7 V dc
Output current (I_{OUT})	-----	70 mA
Common mode input voltage (V_{CM})	-----	V_{\pm}
Differential input voltage	-----	10 V
Gain controlled input voltage (V_G)	-----	V_{\pm}
Referenced input voltage (V_{REF})	-----	V_{\pm}
Power dissipation (P_D)	-----	409 mW
Thermal resistance, junction-to-ambient (Θ_{JA})	-----	$+75^{\circ}$ C/W
Thermal resistance, junction-to-case (Θ_{JC})	-----	See MIL-STD-1835
Junction temperature (T_J)	-----	$+175^{\circ}$ C
Storage temperature range	-----	-65° C to $+150^{\circ}$ C
Lead temperature (soldering, 10 seconds)	-----	$+300^{\circ}$ C

1.4 Recommended operating conditions.

Supply voltage (V_{\pm})	-----	± 5 V dc
Gain range (A_V)	-----	± 2 to ± 100
Reference input voltage (V_{REF})	-----	± 150 mV
Ambient operating temperature range (T_A)	-----	-55° C to $+125^{\circ}$ C

2. APPLICABLE DOCUMENTS

2.1 Government specifications, standards, bulletin, and handbook. Unless otherwise specified, the following specifications, standards, bulletin, and handbook of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

SPECIFICATIONS

MILITARY

MIL-M-38510	-	Microcircuits, General Specification for.
MIL-I-38535	-	Integrated Circuits, Manufacturing, General Specification for.

STANDARDS

MILITARY

MIL-STD-480	-	Configuration Control-Engineering Changes, Deviations and Waivers.
MIL-STD-883	-	Test Methods and Procedures for Microelectronics.
MIL-STD-1835	-	Microcircuit Case Outlines.

BULLETIN

MILITARY

MIL-BUL-103	-	List of Standardized Military Drawings (SMD's).
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HANDBOOK

MILITARY

MIL-HDBK-780	-	Standardized Military Drawings.
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(Copies of the specifications, standards, bulletin, and handbook required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take precedence.

^{1/} Stresses above the absolute maximum rating may cause permanent damage to the device. Extended operation at the maximum levels may degrade performance and affect reliability.

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3. REQUIREMENTS

3.1 Item requirements. The individual item requirements for device class M shall be in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices" and as specified herein. The individual item requirements for device classes B and S shall be in accordance with MIL-M-38510 and as specified herein. For device classes B and S, a full electrical characterization table for each device type shall be included in this SMD. The individual item requirements for device classes Q and V shall be in accordance with MIL-I-38535, the device manufacturer's Quality Management (QM) plan, and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 for device classes M, B, and S and MIL-I-38535 for device classes Q and V and herein.

3.2.1 Case outline(s). The case outline(s) shall be in accordance with 1.2.4 herein.

3.2.2 Terminal connections. The terminal connections shall be as specified on figure 1.

3.3 Electrical performance characteristics and postirradiation parameter limits. Unless otherwise specified herein, the electrical performance characteristics and postirradiation parameter limits are as specified in table I and shall apply over the full ambient operating temperature range.

3.4 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table IIA. The electrical tests for each subgroup are defined in table I.

3.5 Marking. The part shall be marked with the PIN listed in 1.2 herein. Marking for device class M shall be in accordance with MIL-STD-883 (see 3.1 herein). In addition, the manufacturer's PIN may also be marked as listed in MIL-BUL-103. Marking for device classes B and S shall be in accordance with MIL-M-38510. Marking for device classes Q and V shall be in accordance with MIL-I-38535.

3.5.1 Certification/compliance mark. The compliance mark for device class M shall be a "C" as required in MIL-STD-883 (see 3.1 herein). The certification mark for device classes B and S shall be a "J" or "JAN" as required in MIL-M-38510. The certification mark for device classes Q and V shall be a "QML" as required in MIL-I-38535.

3.6 Certificate of compliance. For device class M, a certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in MIL-BUL-103 (see 6.7.3 herein). For device classes Q and V, a certificate of compliance shall be required from a QML-38535 listed manufacturer in order to supply to the requirements of this drawing (see 6.7.2 herein). The certificate of compliance submitted to DESC-ECS prior to listing as an approved source of supply for this drawing shall affirm that the manufacturer's product meets, for device class M the requirements of MIL-STD-883 (see 3.1 herein), or for device classes Q and V, the requirements of MIL-I-38535 and the requirements herein.

3.7 Certificate of conformance. A certificate of conformance as required for device class M in MIL-STD-883 (see 3.1 herein) or device classes B and S in MIL-M-38510 or for device classes Q and V in MIL-I-38535 shall be provided with each lot of microcircuits delivered to this drawing.

3.8 Notification of change for device class M. For device class M, notification to DESC-ECS of change of product (see 6.2 herein) involving devices acquired to this drawing is required for any change as defined in MIL-STD-480.

3.9 Verification and review for device class M. For device class M, DESC, DESC's agent and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

3.10 Microcircuit group assignment for device classes M, B, and S. Device classes M, B, and S devices covered by this drawing shall be in microcircuit group number 49 (see MIL-M-38510, appendix E).

3.11 Serialization for device class S. All device class S devices shall be serialized in accordance with MIL-M-38510.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ -55° C ≤ T _A ≤ +125° C unless otherwise specified	Group A subgroups	Device type	Limits 2/		Unit
					Min	Max	
Static and dc characteristics							
Input bias current (noninverting)	+I _{IN}		1, 2	01	-28	+28	μA
			3		-61	+61	
Input bias current (inverting)	-I _{IN}		1, 2	01	-28	+28	μA
			3		-61	+61	
Output offset voltage	V _{OO}		1	01	-120	+120	mV
			2, 3		-150	+150	
Average +input bias current drift	T _C (+I _{IN})	3/	2	01	-165	+165	nA/° C
			3		-415	+415	
Average -input bias current drift	T _C (-I _{IN})	3/	2	01	-165	+165	nA/° C
			3		-415	+415	
Average output offset voltage drift	T _C (V _{OO})	3/	2	01	-300	+300	μV/° C
			3		-400	+400	
Output voltage swing	+V _O	No load	4, 5	01	+3.2		V
			6		+3.0		
	-V _O		4, 5	01		-3.2	
			6			-3.0	
Quiescent supply current	I _{CC}	No load	1, 2, 3	01		38	mA
Power supply rejection ratio	PSRR	V+ = +4.5 V to +5.0 V V- = -4.5 V to -5.0 V Output referred dc	1, 3	01		20	mV/V
			2			28	
Gain controlled input voltage	V _G	3/	1, 2, 3	01	0	2	V
Common mode rejection ratio	CMRR	V _{CM} = 1.0 V 4/	4, 5, 6	01	59		dB
Input offset current	I _{IO}	3/	1, 2	01		2	μA
			3			4	

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ -55° C ≤ T _A ≤ +125° C unless otherwise specified	Group A subgroups	Device type	Limits 2/		Unit
					Min	Max	
Static and dc characteristics - Continued							
Average input offset current drift C _{IO} (I)	T _{IO}	3/	2	01		20	μA/°C
			3			40	
Gain accuracy	GACCU	A _V = 20 dB, R _F = 1 kΩ, 3/ R _G = 182Ω	4, 5	01	-0.5	+0.5	dB
			6		-1.0	+1.0	
Integral signal nonlinearity	SGNL	V _{OUT} = 4 V _{PP} 3/	4, 6	01		0.1	%
			5			0.2	
Differential voltage range	+V _{DM}	R _G = 182Ω 3/	4, 6	01	+250		mV
	5		+210				
	-V _{DM}		4, 6	02		-250	
			5			-210	
Signal input resistance	R _{IN}	3/	4, 5	01	100		kΩ
			6		50		
Signal input capacitance	C _{IN}	3/	4, 5, 6	01		2	pF
Gain controlled input resistance	R _{INC}	3/	4, 5	01	600		Ω
			6		535		
Gain controlled input capacitance	C _{INC}	3/	4, 5, 6	01		2	pF
Common mode voltage range	+V _{CM}	No load 3/	4, 5	01	+2		V
	6		+1.4				
	-V _{CM}		4, 5			-2	
			6			-1.4	
Output current	+I _{OUT}	4/	4, 5	01	+50		mA
	6		+30				
	-I _{OUT}		4, 5			-50	
			6			-30	
Output impedance	R _{OUT}	At dc 3/	4, 5	01		0.2	Ω
			6			0.3	

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ -55° C ≤ T _A ≤ +125° C unless otherwise specified	Group A subgroups	Device type	Limits 2/		Unit
					Min	Max	
Frequency domain response							
Gain flatness peaking low	GFPL	At 0.1 MHz to 30 MHz V _{OUT} < 0.5 V _{PP}	4	01		0.3	dB
			5, 6 3/			0.4	
Gain flatness peaking high	GFPH	At 0.1 MHz to 200 MHz, V _{OUT} < 0.5 V _{PP}	4	01		0.5	dB
			5, 6 3/			0.7	
Gain flatness rolloff	GFR	At 0.1 MHz to 30 MHz, V _{OUT} < 0.5 V _{PP}	4	01		0.3	dB
			5, 6 3/			0.4	
		At 0.1 MHz to 60 MHz, V _{OUT} < 0.5 V _{PP}	4			1.0	
			5, 6 3/			1.3	
Small signal bandwidth	SSBW	-3 dB bandwidth, V _{OUT} < 0.5 V _{PP}	4	01	120		MHz
			5 3/		120		
			6 3/		110		
Large signal bandwidth	LSBW	-3 dB bandwidth, 3/ V _{OUT} < 4 V _{PP}	4, 5	01	100		MHz
			6		85		
Gain control channel small signal bandwidth	SBWC	-3 dB bandwidth, 3/ V _{OUT} < 0.5 V _{PP} V _{IN} = +0.2 V, V _G = +1 V	4, 5, 6	01	80		MHz

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ -55° C ≤ T _A ≤ +125° C unless otherwise specified	Group A subgroups	Device type	Limits 2/		Unit
					Min	Max	
Frequency domain response - Continued							
Linear phase deviation	LPD	At 0.1 MHz to 60 MHz 3/	4	01		1	Degrees
			5, 6			1.2	
Feedthrough	FDTH	V _{IN} = -22 dBm at 30 MHz, V _G = 0 V 3/	4, 5, 6	01		-38	dB
Time domain response							
2nd harmonic distortion	HD2	2 V _{PP} at 20 MHz	4	01		-40	dBc
			5 3/			-35	
			6 3/			-40	
3rd harmonic distortion	HD3	2 V _{PP} at 20 MHz	4	01		-50	dBc
			5 3/			-45	
			6 3/			-50	
Equivalent output noise floor	SNF	At 1 MHz to 200 MHz 3/	4, 6	01		-130	dBm/Hz
			5			-129	
Equivalent output integrated noise	INV	At 1 MHz to 200 MHz 3/	4, 6	01		1000	μV
			5			1100	
Rise and fall time	TRS	0.5 V step, C _L < 10 pF, 3/ measured between 10 percent and 90 percent	9, 10	01		3	ns
			11			3.7	
	TRL	4 V step, C _L < 10 pF, 3/ measured between 90 percent and 10 percent	9, 10, 11			5	

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ -55° C ≤ T _A ≤ +125° C unless otherwise specified	Group A subgroups	Device type	Limits 2/		Unit
					Min	Max	
Time domain response - Continued							
Settling time	t _S	2 V step at 0.1% of the 3/ final value, C _L < 10 pF	9, 10, 11	01		18	ns
Overshoot	OS	0.5 V step, C _L < 10 pF 3/	9, 10, 11	01		15	%
Slew rate	+SR	Rising edge, measured at 3/ ±1 V with 4 V step, C _L < 10 pF	9, 10, 11	01	1450		V/μs
	-SR	Falling edge, measured at 3/ ±1 V with 4 V step, C _L < 10 pF	9, 10, 11	01	1450		

^{1/} Unless otherwise specified, V_± = ±5 V dc, A_V = +10, load resistance R_L = 100Ω, feedback resistance (R_F) = 1 kΩ, and gain setting resistance (R_G) = 182Ω.

^{2/} The algebraic convention, whereby the most negative value is a minimum and the most positive is a maximum, is used in this table. Negative current shall be defined as conventional current flow out of a device terminal.

^{3/} If not tested, shall be guaranteed to the limits specified in table I herein.

^{4/} Group A testing only.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. For device class M, sampling and inspection procedures shall be in accordance with section 4 of MIL-M-38510 to the extent specified in MIL-STD-883 (see 3.1 herein). For device classes B and S, sampling and inspection procedures shall be in accordance with MIL-M-38510 and method 5005 of MIL-STD-883, except as modified herein. For device classes Q and V, sampling and inspection procedures shall be in accordance with MIL-I-38535 and the device manufacturer's QM plan.

4.2 Screening. For device class M, screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. For device classes B and S, screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to qualification and quality conformance inspection. For device classes Q and V, screening shall be in accordance with MIL-I-38535, and shall be conducted on all devices prior to qualification and technology conformance inspection. The following additional criteria shall apply.

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Device type	01
Case outline	P
Terminal number	Terminal symbol
1	V+
2	V _G
3	INPUT+
4	R _{G+}
5	R _{G-}
6	INPUT-
7	V-
8	V-
9	V _{REF}
10	OUTPUT
11	GND
12	I-
13	NC
14	V+

NC = No connection

FIGURE 1. Terminal connections.

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4.2.1 Additional criteria for device classes M, B, and S.

- a. Burn-in test, method 1015 of MIL-STD-883.
 - (1) Test condition B. For device class M, the test circuit shall be submitted to DESC-ECS for review with the certificate of compliance. For device classes B and S, the test circuit shall be submitted to the qualifying activity.
 - (2) $T_A = +125^{\circ}\text{C}$, minimum.
- b. Interim and final electrical test parameters shall be as specified in table IIA herein.

4.2.2 Additional criteria for device classes Q and V.

- a. The burn-in test duration, test condition and test temperature or approved alternatives shall be as specified in the device manufacturer's QM plan in accordance with MIL-I-38535. The burn-in test circuit shall be submitted to DESC-ECS with the certificate of compliance and shall be under the control of the device manufacturer's Technology Review Board (TRB) in accordance with MIL-I-38535.
- b. Interim and final electrical test parameters shall be as specified in table IIA herein.
- c. Additional screening for device class V beyond the requirements of device class Q shall be as specified in appendix B MIL-I-38535 and as detailed in table IIB herein.

4.3 Qualification inspection.

4.3.1 Qualification inspection for device classes B and S. Qualification inspection for device classes B and S shall be in accordance with MIL-M-38510. Inspections to be performed shall be those specified in method 5005 of MIL-STD-883 and herein for groups A, B, C, D, and E inspections (see 4.4.1 through 4.4.5).

4.3.2 Qualification inspection for device classes Q and V. Qualification inspection for device classes Q and V shall be in accordance with MIL-I-38535. Inspections to be performed shall be those specified in MIL-I-38535 and herein for groups A, B, C, D, and E inspections (see 4.4.1 through 4.4.5).

4.4 Conformance inspection. Quality conformance inspection for device class M shall be in accordance with MIL-STD-883 (see 3.1 herein) and as specified herein. Quality conformance inspection for device classes B and S shall be in accordance with MIL-M-38510 and as specified herein. Inspections to be performed for device classes M, B, and S shall be those specified in method 5005 of MIL-STD-883 and herein for groups A, B, C, D, and E inspections (see 4.4.1 through 4.4.5). Technology conformance inspection for classes Q and V shall be in accordance with MIL-I-38535 including groups A, B, C, D, and E inspections and as specified herein except where option 2 of MIL-I-38535 permits alternate in-line control testing.

4.4.1 Group A inspection.

- a. Test shall be as specified in table II herein.
- b. Subgroups 7 and 8 in table I, method 5005 of MIL-STD-883 shall be omitted.

4.4.2 Group B inspection. The group B inspection end-point electrical parameters shall be as specified in table IIA herein.

4.4.3 Group C inspection. The group C inspection end-point electrical parameters shall be as specified in table IIA herein.

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TABLE IIA. Electrical test requirements.

Test requirements	Subgroups (per method 5005,table I)			Subgroups (per MIL-I-38535, table III)	
	Device class M	Device class B	Device class S	Device class Q	Device class V
Interim electrical parameters (see 4.2)	---	---	---	---	---
Final electrical parameters (see 4.2)	1,2, <u>1</u> / 3,4	1,2, <u>1</u> / 3,4	1,2, <u>1</u> / 3,4	1,2, <u>1</u> / 3,4	1,2, <u>1</u> / 3,4
Group A test requirements (see 4.4)	1,2, <u>2</u> / 3,4,5,6, 9,10,11	1,2,3, 4,5,6, 9,10,11	1,2,3, 4,5,6, 9,10,11	1,2,3, 4,5,6, 9,10,11	1,2,3, 4,5,6, 9,10,11
Group B end-point electrical parameters (see 4.4)	---	---	1,2,3, 4,5,6, 9,10,11	---	1,2,3, 4,5,6, 9,10,11
Group C end-point electrical parameters (see 4.4)	1	1	---	1	---
Group D end-point electrical parameters (see 4.4)	1	1	1	1	1
Group E end-point electrical parameters (see 4.4)	---	---	---	---	---

1/ PDA applies to subgroup 1.

2/ Subgroups 9, 10, and 11, if not tested, shall be guaranteed to the limits specified in table I.

4.4.3.1 Additional criteria for device classes M, B, and S. Steady-state life test conditions, method 1005 of MIL-STD-883:

- a. Test condition B. For device class M, the test circuit shall be submitted to DESC-ECS for review with the certificate of compliance. For device classes B and S, the test circuit shall be submitted to the qualifying activity.
- b. $T_A = +125^\circ\text{C}$, minimum.
- c. Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

4.4.3.2 Additional criteria for device classes Q and V. The steady-state life test duration, test condition and test temperature or approved alternatives shall be as specified in the device manufacturer's QM plan in accordance with MIL-I-38535. The steady-state life test circuit shall be submitted to DESC-ECS with the certificate of compliance and shall be under the control of the device manufacturer's TRB in accordance with MIL-I-38535.

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TABLE IIB. Additional screening for device class V.

Test	MIL-STD-883, test method	Lot requirement
Particle impact noise detection	2020	100 percent
Internal visual	2010, condition A or approved alternate	100 percent
Nondestructive bond pull	2023 or approved alternate	100 percent
Reverse bias burn-in	1015	100 percent
Burn-in	1015, total of 240 hours at +125°C	100 percent
Radiographic	2012	100 percent

4.4.4 Group D inspection. The group D inspection end-point electrical parameters shall be as specified in table IIA herein.

4.4.5 Group E inspection. Group E inspection is required only for parts intended to be marked as radiation hardness assured (see 3.5 herein). RHA levels for device classes B and S shall be M, D, R, and H and for device class M shall be M and D. RHA quality conformance inspection sample tests shall be performed at the RHA level specified in the acquisition document.

- a. RHA tests for device classes B and S for levels M, D, R, and H or for device class M for levels M and D shall be performed through each level to determine at what levels the devices meet the RHA requirements. These RHA tests shall be performed for initial qualification and after design or process changes which may affect the RHA performance of the device.
- b. End-point electrical parameters shall be as specified in table IIA herein.
- c. Prior to total dose irradiation, each selected sample shall be assembled in its qualified package. It shall pass the specified group A electrical parameters in table I for subgroups specified in table IIA herein.
- d. For device classes M, B, and S, the devices shall be subjected to radiation hardness assured tests as specified in MIL-M-38510 for RHA level being tested, and meet the post irradiation end-point electrical parameter limits as defined in table I at $T_A = +25^\circ\text{C} \pm 5$ percent, after exposure.
- e. Prior to and during total dose irradiation testing, the devices shall be biased to establish a worst case condition as specified in the radiation exposure circuit.
- f. For device classes M, B, and S subgroups 1 and 2 in table V, method 5005 of MIL-STD-883 shall be tested as appropriate for device construction.
- g. When specified in the purchase order or contract, a copy of the RHA delta limits shall be supplied.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510 for device classes M, B, and S and MIL-I-38535 for device classes Q and V.

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6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use for Government microcircuit applications (original equipment), design applications, and logistics purposes.

6.1.1 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

6.1.2 Substitutability. Device classes B and Q devices will replace device class M devices.

6.2 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated with the users of record for the individual documents. This coordination will be accomplished in accordance with MIL-STD-481 using DD Form 1693, Engineering Change Proposal (Short Form).

6.3 Record of users. Military and industrial users shall inform Defense Electronics Supply Center when a system application requires configuration control and which SMD's are applicable to that system. DESC will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronic devices (FSC 5962) should contact DESC-ECS, telephone (513) 296-6021.

6.4 Comments. Comments on this drawing should be directed to DESC-ECS, Dayton, Ohio 45444, or telephone (513) 296-5377.

6.5 Abbreviations, symbols, and definitions. The abbreviations, symbols, and definitions used herein are defined in MIL-M-38510 and MIL-STD-1331.

6.6 One part - one part number system. The one part - one part number system described below has been developed to allow for transitions between identical generic devices covered by the four major microcircuit requirements documents (MIL-M-38510, MIL-H-38534, MIL-I-38535, and 1.2.1 of MIL-STD-883) without the necessity for the generation of unique PIN's. The four military requirements documents represent different class levels, and previously when a device manufacturer upgraded military product from one class level to another, the benefits of the upgraded product were unavailable to the Original Equipment Manufacturer (OEM), that was contractually locked into the original unique PIN. By establishing a one part number system covering all four documents, the OEM can procure to the highest class level available for a given generic device to meet system needs without modifying the original contract parts selection criteria.

<u>Military documentation format</u>	<u>Example PIN under new system</u>	<u>Manufacturing source listing</u>	<u>Document listing</u>
New MIL-M-38510 Military Detail Specifications (in the SMD format)	5962-XXXXXXZ(B or S)YY (Part 1 or 2)	QPL-38510	MIL-BUL-103
New MIL-H-38534 Standardized Military Drawings	5962-XXXXXXZ(H or K)YY	QML-38534	MIL-BUL-103
New MIL-I-38535 Standardized Military Drawings	5962-XXXXXXZ(Q or V)YY	QML-38535	MIL-BUL-103
New 1.2.1 of MIL-STD-883 Standardized Military Drawings	5962-XXXXXXZ(M)YY	MIL-BUL-103	MIL-BUL-103

6.7 Sources of supply.

6.7.1 Sources of supply for device classes B and S. Sources of supply for device classes B and S are listed in QPL-38510.

6.7.2 Sources of supply for device classes Q and V. Sources of supply for device classes Q and V are listed in QML-38535. The vendors listed in QML-38535 have submitted a certificate of compliance (see 3.6 herein) to DESC-ECS and have agreed to this drawing.

6.7.3 Approved sources of supply for device class M. Approved sources of supply for class M are listed in MIL-BUL-103. The vendors listed in MIL-BUL-103 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DESC-ECS.

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STANDARDIZED MILITARY DRAWING SOURCE APPROVAL BULLETIN

DATE: 92-06-24

Approved sources of supply for SMD 5962-91694 are listed below for immediate acquisition only and shall be added to MIL-BUL-103 during the next revision. MIL-BUL-103 will be revised to include the addition or deletion of sources. The vendors listed below have agreed to this drawing and a certificate of compliance has been submitted to and accepted by DESC-ECS. This bulletin is superseded by the next dated revision of MIL-BUL-103.

Standardized military drawing PIN	Vendor CAGE number	Vendor similar PIN <u>1/</u>
5962-9169401MCX	62839	CLC520A8D or CLC520A8B

1/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

Vendor CAGE
number

62839

Vendor name
and address

Comlinear Corporation
4800 Wheaton Drive
Fort Collins, CO 80525-9483

The information contained herein is disseminated for convenience only and the Government assumes no liability whatsoever for any inaccuracies in this information bulletin.
